which each depression was first and last observed, and the hourly velocity of each depression:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I.	51 00	97 00	52 00	63 00	39.0
II.	38 00	107 00	51 00	62 00	41.0
III.	37 00	108 00	45 00	61 00	30.5
IV.	53 00	96 00	51 00	81 00	42.0
V.	53 00	99 00	50 00	69 00	24.0
VI.	53 00	102 00	50 00	92 00	28.0
VII.	46 00	106 00	51 00	66 00	28.0
VIII.	37 00	104 00	37 00	73 00	18.5
Mean hourly velocity.....					31.4

I.—This disturbance developed in British America during the latter part of June, and was central in Manitoba on the morning of the 1st of July. It moved slightly to the southward during the 1st, approaching Lake Superior, where brisk southerly winds occurred, while the centre of disturbance was north of the upper lake region. The easterly movement of this depression was slightly retarded as it passed near the lake region on the 1st, but it passed rapidly down the Saint Lawrence valley on the 2d, increasing in energy and causing severe gales at stations near the centre of disturbance. When first observed in the northwest the barometer at the centre read 29.66, and when last observed in the northeast the barometer at the centre had fallen to 29.31. The rain area attending this disturbance extended over the lake region, New England, and New York, but the rainfalls were light and of short duration.

II.—This disturbance was developing slowly in the Rocky mountain region when the preceding low area was passing off the coast of New Brunswick. It was apparently central in Colorado on the afternoon of the 2d, but passed northeastward to southern Dakota during the night, afterwards returning to eastern Colorado before moving eastward over the lake region. The 11 p. m. tri-daily chart of the 3d shows a trough of low pressure extending from northeast to southwest, over the upper lake region and northwest, with apparently two centres of disturbance—one near Saint Paul, Minnesota, which is given on the storm-track, and a second near Cheyenne, Wyoming. The last named disturbance apparently moved to the southwest, and formed a part of an extended low area which was afterwards traced as number iii. The principal disturbance moved rapidly northeastward after passing the Mississippi valley, and disappeared to the east of the Gulf of Saint Lawrence on the 5th. This disturbance did not extend south of the Ohio valley and the pressure did not fall below 29.70 at stations near its centre.

III.—This storm developed in western Colorado on the 4th, and remained almost stationary in that region until the morning of the 6th, when the centre was located near West Las Animas, the barometer indicating a pressure of 29.67 at that station at 11 p. m. of the 5th, and 29.77 at the 7 a. m. report of the 6th, with a general increase of pressure and northerly winds in Colorado, thus indicating an easterly movement of the disturbance. On the afternoon of the 6th there was a well-marked low area in the upper Mississippi valley, and local rains were reported in the central valley and lake region. Strong north and west winds prevailed at stations in the Missouri valley, Kansas, and Nebraska, and violent local storms occurred in Minnesota. At midnight of the 3d this storm was central in eastern Wisconsin, the isobar of 29.70 inclosing the centre and extending east and west south of Lake Superior. Very heavy rains and destructive storms occurred in Michigan and Wisconsin during the night of the 6th. The morning reports of the 7th showed a contraction of the central area in a north and south direction, probably due to the advance of a volume of cool air from the north, previously referred to as high area number ii. This disturbance passed from north of Lake Ontario to east Nova Scotia during the 7th, but rain continued in the northern districts until the 8th, and on the middle Atlantic and New England coasts until the 9th. A secondary depression developed on the middle Atlantic coast after the principal area had passed over the Atlantic, causing heavy rains and violent local winds at stations between Cape Hatteras, North Carolina, and Sandy Hook, New Jersey.

IV.—This depression was at no time within the limits of the territory of the United States. On the afternoon of the 9th a slight depression appeared north of Manitoba, and the succeeding report indicated that this disturbance passed directly eastward north of the lake region. The location of the centre of this area is approximately given for the 11 p. m. report of the 9th, and the 7 a. m. report of the 10th. Local rains occurred in the lake region and Saint Lawrence valley on the 10th.

V.—This was a well-marked disturbance which appeared north of Minnesota on the morning of the 11th. It moved southeastward during the 11th, the pressure near the centre being near 29.50, and at midnight the centre was near Duluth, Minnesota, with cool northerly winds at Saint Vincent, Minnesota, and Fort Garry, Manitoba. After reaching the lake region the course changed to easterly, and the storm continued in this direction until the afternoon report of the 12th, when its course changed to the northeast, near Saugeen, Ontario. This was a general disturbance, causing rain in all districts north of the Gulf states. When this disturbance passed over the Saint Lawrence valley, it was apparently retarded, losing much of its energy, while becoming much extended.

VI.—Appeared in British America, on the 13th, and passed southeastward towards Lake Superior, but was last observed as central north of Duluth on the afternoon of the 14th. Although there were indications of a slight depression in the lake region following that report, no well-marked area could be located.

VII.—On the morning of the 15th a well-defined low area was central in the Yellowstone valley, near Fort Keogh, Montana, inclosed by an elliptical isobar of 29.70. This depression moved first southward to eastern Colorado, and after the afternoon report of the 15th it moved to the northeast or east. On the morning of the 16th the storm was central immediately west of Duluth, and at the 3 p. m report of the same day it was central near and northeast of that station, the barometer falling to 29.50, and wind sw., 24 miles. The centre passed directly east during the succeeding reports, attended by severe local storms in the northern portions of the lake region, during the night of the 17th. After reaching the Saint Lawrence valley the course changed to the northeast, and this movement continued until the storm passed beyond the stations of observation, on the 18th.

VIII.—The atmospheric pressure was below the normal at the stations west of the Mississippi valley during the 20th and 21st, and slight depressions formed north of Dakota and on the eastern slope of the Rocky Mountains. The depression traced as number viii. was central in southeastern Colorado at 3 p. m. of the 20th, and it remained in that region until the 23d, moving first to northern Texas, then to southern Dakota, thence back to eastern Colorado and western Nebraska, after which it passed eastward over southern Dakota and southern Minnesota, the course then changing to southeast after passing the Mississippi valley, and crossed the eastern portion of the United States during the 23d and 24th, leaving the Virginia coast as a well marked disturbance. This was the only disturbance occurring during the month which passed south of the lake region. It was well defined, but the depression at the centre was not greater than 29.70.

NORTH ATLANTIC STORMS DURING JULY, 1883.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0—10.]

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during July, 1883.

The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in

the north Atlantic, and from other miscellaneous data received at this office up to August 21st. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m. Washington, or 0 h. 8. m. p. m. Greenwich mean time.

For the month of July, 1883, the paths of seven areas of barometric minima have been traced. Three of these first appeared near W. 15° and passed northeastward over the British Isles; two were probably continuations of storms that first developed in the United States, while the remaining two appear to have originated near the coast. None of the depressions charted have displayed any special storm-energy, with the exception of low-area iii., which moved northeastward with unusual rapidity as a somewhat severe storm, the barometer near the centre of disturbance falling to 29.00 (736.6.)

The weather over the Atlantic during the month may be summarized as follows: 1st to 9th, moderate to strong breezes, generally from west and southwest, weather overcast; 9th to 12th, moderate to strong gales between 20° and 40° west longitude, weather cloudy and rainy; 12th to 21st, light to moderate breezes, variable in direction, and generally cloudy weather with occasional fog and rain; 21st to the close of the month, moderate to strong southerly, westerly and northwesterly breezes, increasing occasionally to moderate gales, weather generally overcast, with frequent rains.

The following descriptions refer to the depressions shown on the chart:

I.—This disturbance was apparently central near N. 55°, W. 17° on the 1st; on that date the s. s. "State of Indiana," in N. 55° 12′, W. 14° 30′, reported barometer 29.2 (741.7), wind ese., force 7, raining. The s. s. "Sardinian," in N. 55° 10′, W. 16° 10′, reported barometer 29.27 (743.4), wind ese., force 6; while the ship "Cornelius," in N. 51° 43′, W. 20° 30′, had wnw. wind of force 8, barometer 29.42 (747.3), heavy rain. During the day the disturbance moved slowly northeastward, and on the 2d it was central off the northwest coast of Ireland, causing strong southerly winds and rain over that country.

II.—From the 5th to the 8th an area of low pressures remained off the Irish coast, causing strong southerly and southwesterly winds in Ireland and over the English Channel. The region of low barometer occupied the ocean from W. 20° eastward to the Irish coast, the pressures ranging from 29.35 (745.5) to 29.75 (755.6). On the 9th an increase of pressure set in over the region east of the fifteenth meridian, but to the westward of that meridian the pressure decreased, under the influence of low-area iii., then advancing rapidly northeastward.

III.—This was probably a continuation of the storm traced as low-area iii., on chart i. At midnight of the 7th the disturbance was central east of Nova Scotia, and by the morning of the 8th it was south of Newfoundland, attended by moderate southwesterly breezes. During the day the disturbance moved rapidly northeastward with decreasing pressure and with greatly increased storm-energy; on the 9th the storm-centre was probably near N. 51°, W. 34°; the s. s. "City of Chester," in N. 50° 31′, W. 32° 38′, reported: 9.58 a. m., barometer 28.85 (732.8) (instrumental error not known), wind sw., force 6, overcast, with rain, barometer falling rapidly. From 6 p. m. until midnight of the 9th, the wind blew with hurricane force from wnw. Other vessels near the same region as the "City of Chester," reported as follows: s. s. "Arizona," in N. 49° 23′, W. 30° 54′, barometer 29.17 (740.9), wind s., force 7, raining, high sw. sea; s. s. "Lord Clive," at 10.13 a. m., in N. 49° 15′, W. 28° 50′, barometer 29.12 (739.6), wind s., force 6, heavy rain; at noon, N. 49° 10′, W. 29° 9′, the barometer read 29.12 (739.6), falling slowly; at 2 p. m. 29.08 (738.6); at 2.30 p. m. the wind suddenly shifted to sw. and w., the barometer rising; at 4 p. m. wind increasing to force 7; from 8 p. m. until 8 a. m. of the 10th, strong w. gale with heavy squalls and high sea. On the 10th the disturbance was central near N. 54° W. 23°, attended by strong northerly and northwesterly gales to the westward of the twenty-fifth meridian, and moderate to strong southwesterly gales south of N. 52°, with moderate southeasterly and easterly breezes to the northward. On the 11th the storm-centre having moved east-northeastward with but slight changes in pressure, was central off the northwestern coast of Ireland, the region of low pressures being inclosed by the isobar for 29.25 (742.9). Strong southwesterly winds prevailed over the British Isles and the English Channel. By the morning of the 12th the disturbance had moved over Scotland, and was central over the northern part of the North sea.

IV.—This disturbance appears to have developed off the New England coast on the 16th, the lowest pressure reported being 29.74 (755.4). It moved eastward with increasing pressure and disappeared on the 17th, without exhibiting any storm-energy.

V.—On the 18th there was a decrease of pressure over the ocean near W. 20°. During the 19th and 20th the decrease spread eastward, and on the last-mentioned date the disturbance was probably central over or near the British Isles.

VI.—This depression appeared over the Gulf of Saint Lawrence on the 23d; it moved slowly over the Gulf causing easterly gales and heavy rains, and by the 25th it was apparently central about N. 48°, W. 50°, near which region vessels reported pressures ranging from 29.4 (746.7) to 29.7 (754.4), with moderate southerly breezes. On the 26th the storm-centre was near N. 51°, W. 45°, the region of least pressure being indicated by the isobar for 29.5 (749.3), while the winds continued light or moderate. On the 27th the disturbance was in N. 54° W. 40°, the s. s. "Colina," in N. 53° 45′, W. 41° 18′, reporting barometer 29.45 (748.0), wind n. by e., force, 2. After the 27th the depression passed beyond the range of the observations.

VII.—This was probably a continuation of the disturbance traced as low area viii. on chart i. It passed off the coast into the Atlantic on the 24th, and on the 25th it was central near N. 37°, W. 71°, the brig "O. C. Clary," in N. 36° 32′, W. 71° 3′, reported barometer 29.4 (746.7), wind wsw., force 6, with violent squalls, rough sea and rainy weather. During the day the depression passed northeastward, attended by moderate gales, and probably united with low area vi. then central near the Banks.

OCEAN ICE.

Chart ii. also exhibits the southern and eastern limits of icebergs in the north Atlantic during the month of July, 1883. This chart is based on reports communicated by shipmasters to this office, reports furnished through the co-operation of the "New York Herald Weather Service," and other data published in the "New York Maritime Register."

During July, 1883, the easternmost icebergs were observed in about N. 46°, W. 45°, the southern limit being about N. 42° 30′, W. 50°. North of the fifty-first parallel, near the Straits of Belle Isle, numerous icebergs were observed, but no field-ice was seen. Icebergs were also reported in the Gulf of Saint Lawrence. South of N. 46° only five small icebergs were observed during the month.

Compared with the chart for the preceding month (June, 1883), there has been a marked change in the extent of the ice region, the eastern limit having moved about two degrees to the westward, while the southern limit is about two degrees farther north than that of last month.

A comparison of this chart with the ice-chart for July, 1882, shows a great change in the positions of the limits of the ice region, and also a very marked diminution in the number of icebergs observed. In July of last year the eastern limit was near W. 40°, or about five and a half degrees farther to the eastward, while the southern limit was on the fortieth parallel, or about two and a half degrees farther south than in July of this year.

Icebergs were reported as follows:

3d.—S. S. "Main," in N. 43° 6′, W. 49° 17′, passed an iceberg; also, in N. 43° 1′, W. 50° 18′, passed another; bark "Saga," in N. 47° 56′, W. 46° 25′, passed an iceberg one hundred and forty-five feet high; also in N. 48° 10′, W. 45° 55′, passed two icebergs.

4th.—S. S. "Pavonia," in N. 42° 42′, W. 49° 57′, passed an iceberg.

5th.—S. S. "Barcelona," one hundred miles east of Anticosti, collided with an iceberg, crushing in the whole of her bows about two feet above the water line; s. s. "Manitoban," in N. 52° 36′, W. 53° 54′, passed an iceberg; also, passed a number of icebergs between N. 52° 57′, W. 51° 15′ and N. 53° 7′, W. 51° 20′.

6th.—S. S. "Wyoming," in N. 46° 47′, W. 45° 44′, passed an iceberg; also, in N. 46° 41′, W. 45° 54′, passed another.

7th.—S. S. "Colina," in N. 52° 20′, W. 51° 21′, passed several large icebergs.

16th.—S. S. "City of Paris," in N. 42° 45′, W. 50° 32′, passed an iceberg.

17th.—S. S. "General Werder," in N. 47° 43′, W. 48° 5′, passed a large iceberg.

19th.—S. S. "Lord Gough," in N. 48° 1′, W. 48° 49′, passed an iceberg; s. s. "Bohemia," N. 46° 41′, W. 48° 54′, passed an iceberg; s. s. "Grecian," between N. 52° 55′, W. 50° 00′ and N. 52° 00′, W. 54° 20′, passed fifteen large icebergs.

25th.—S. S. "Colina," from Quebec to Glasgow, sighted about forty icebergs during the passage, the easternmost one being in N. 52° 36′, W. 48° 5′.

25th and 26th.—S. S. "Lake Huron," from two hundred miles east-northeast of the Straits of Belle Isle, up to the Straits, passed about seventy icebergs, some very large.

29th.—S. S. "Sylvia," on the edge of the Banks, passed a large iceberg.

31st.—S. S. "Durham City," in N. 49° 45′, W. 48° 30′, passed seven large icebergs, one of which was about three hundred feet high and two miles long.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada, for the month of July, 1883, is exhibited on chart iii., by the dotted isothermal lines.

In the first column of the following table are shown the normal temperatures of July in the several districts, as determined from the Signal-Service records; the second column shows the mean temperature of July, 1883, and the third column shows the departures of July, 1883, from the normal:

Average Temperatures for July, 1883.

Districts.	Average for July. Signal-Service observations.		Comparison of July, 1883, with the average for several years.
	For several years.	For 1883.	
	°	°	°
New England	69.8	69.0	0.8 below.
Middle Atlantic states	75.6	75.3	0.3 below.
South Atlantic states	80.4	81.5	1.1 above.
Florida peninsula	83.0	84.2	1.2 above.
Eastern Gulf	81.2	81.8	0.6 above.
Western Gulf	82.7	82.1	0.6 below.
Tennessee	79.4	78.1	1.3 below.
Ohio valley	77.8	75.4	2.4 below.
Lower lakes	70.9	68.4	2.5 below.
Upper lakes	68.5	65.9	2.6 below.
Extreme northwest	68.7	65.5	3.2 below.
Upper Mississippi valley	76.1	74.1	2.0 below.
Missouri valley	76.0	73.7	2.3 below.
Northern slope	69.1	66.9	2.2 below.
Middle slope	73.7	73.6	0.1 below.
Southern slope	81.5	80.0	1.5 below.
Northern plateau	70.2	72.6	2.4 above.
Southern plateau	82.0	80.0	2.0 below.
North Pacific	66.7	66.9	0.2 above.
Middle Pacific	71.2	72.3	1.1 above.
South Pacific	80.0	80.9	0.9 above.
Mount Washington, N. H	48.0	46.4	1.6 below.
Pike's Peak, Colo	40.4	39.1	1.3 below.
Salt Lake City, Utah	76.4	75.9	0.5 below.

The month of July, 1883, has been colder than the average in nearly all sections of the country. The Pacific coast, northern plateau, the south Atlantic and east Gulf states, are the only districts in which the mean temperature has been above the normal. In California it has averaged 1° above the mean; in the north Pacific coast region, 0.2; northern plateau, 2°.4; and in the south Atlantic and east Gulf states, about 1°. The region where the greatest departures below the normal temperature have occurred, embraces the territory extending from the lower lakes westward to the Rocky mountains, and from the Ohio and Missouri rivers northward to British America. The deficiencies in these districts vary from 2° in the upper Mississippi valley to 3°.2 in the extreme northwest. In New England, the middle Atlantic and west Gulf states, and middle slope, the mean temperature is less than 1° below the normal.

The general distribution of mean temperature, and the districts of maximum departures for the month of July, in each year since 1873, are as follows:

Districts.	Maximum departures.	Year.	Remarks.
	°		
		1873...	Normal in the extreme northwest, lake region, and lower Mississippi valley; below the normal in the south Atlantic and west Gulf states, and upper Mississippi valley; above the normal in New England, the middle Atlantic states and lower Missouri valley.
Lower Missouri valley	+ 4.6	1874...	Above the normal in the upper lake region, Minnesota, and in the Ohio, upper Mississippi and lower Missouri valleys; below the normal in the lower lake region, Saint Lawrence valley, and in the states bordering on the Atlantic and Gulf coasts, and also on the Pacific coast.
Ohio valley and Tennessee	+ 2.1		
South Atlantic states	— 2.3		
Pacific coast	— 2.2		
Saint Lawrence valley	— 2.0		
South Atlantic states	+ 2.7	1875...	Normal in Minnesota; above the normal in Tennessee and the Ohio valley, lower lake region, and in the Atlantic and Gulf states; below the normal in the upper lake region, and in the lower Missouri, upper Mississippi and Saint Lawrence valleys.
Gulf states	+ 1.8		
Lower lakes	+ 1.3		
Upper lakes	— 2.1		
Saint Lawrence valley	— 2.0		
Lower lakes	+ 4.5	1876...	Above the normal in Minnesota, and in all districts east of the Mississippi river; slightly below the normal in the lower Missouri valley; normal in the upper Mississippi valley.
Middle Atlantic states	+ 3.5		
New England	+ 2.7		
Lower Missouri valley	— 0.2		
Pacific coast	+ 1.3	1877...	Normal in the upper Missouri valley and in New England; slightly above the normal in Minnesota, the lake region, middle and south Atlantic and Gulf states, on the Pacific coast and at the Rocky mountain stations; slightly below the normal in the Ohio, upper Mississippi and lower Missouri valleys, and in Tennessee.
Minnesota	+ 1.3		
South Atlantic states	+ 1.2		
Gulf states	+ 1.2		
Lower Missouri valley	— 1.2		
Upper Mississippi valley	— 0.4		
Upper lakes	+ 4.4	1878...	Above the normal in all districts east of the Missouri and lower Mississippi rivers; slightly below the normal on the Pacific coast.
Lower lakes	+ 3.7		
Ohio valley and Tennessee	+ 2.6		
Minnesota	+ 2.6		
Pacific coast	— 1.1		
Upper lakes	+ 2.6	1879...	Below the normal west of the Rocky mountains, in the Saint Lawrence valley, New England and middle Atlantic states; normal in the east Gulf states; above the normal in all other districts.
Rio Grande valley	+ 2.0		
Ohio valley and Tennessee	+ 2.0		
North Pacific coast	— 2.2		
Middle Pacific coast	— 2.2		
Saint Lawrence valley	— 2.1		
Canadian Maritime stations	+ 2.6	1880...	Normal in the middle Atlantic states; below the normal in all other parts of the country, except at the Canadian Maritime stations, in New England, Florida, and on the middle Pacific coast.
Florida	+ 0.7		
Middle Pacific coast	+ 0.7		
Northern plateau	— 3.2		
Ohio valley and Tennessee	— 2.2		
Eastern Gulf	— 2.1		
Pike's Peak	+ 3.0	1881...	Below the normal in the districts west of the Rocky mountains; above the normal in all eastern districts, except normal in the middle Atlantic states, and northern slope.
Ohio valley	+ 2.1		
Western Gulf	+ 2.0		
Northern plateau	— 4.3		
North Pacific coast	— 3.3		
South Pacific coast	— 2.9		
Northern plateau	+ 1.1	1882...	Below the normal in all parts of the country, except in New England, the northern plateau, and in California. The deficiencies are slight along the Atlantic coast, in Tennessee, the southern and middle plateau districts, and in the north Pacific coast region.
Middle Pacific coast	+ 1.0		
Upper Mississippi valley	— 6.0		
Ohio valley	— 5.1		
Missouri valley	— 4.9		

The following are some of the highest and lowest monthly mean temperatures reported from the Signal-Service stations:

Stations reporting highest.	°	Stations reporting lowest.	°
Yuma, Arizona	92.1	Cape Mendocino, California	52.0
Phœnix, Arizona	89.0	San Francisco, California	58.8
Rio Grande City, Texas	86.2	Eastport, Maine	60.2
Key West, Florida	84.8	Saint Vincent, Minnesota	62.0
Savannah, Georgia	84.4	Marquette, Michigan	62.0
Jacksonville, Florida	84.1	Fort Shaw, Montana	62.1
Shreveport, Louisiana	83.9	Fort Maginnis, Montana	62.5
Key West, Florida	83.8	Mackinaw City, Michigan	62.5
Mobile, Alabama	83.6	Alpena, Michigan	63.2
New Orleans, Louisiana	83.5	Escanaba, Michigan	63.8
Sanford, Florida	83.5	Cheyenne, Wyoming	64.1

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal-Service stations are shown in the table of average tem-

peratures for July, 1883. Voluntary observers report the following notes in connection with this subject:

Illinois.—Anna, Union county: mean temperature, 76°.2, is 2°.9 below the July average of the last eight years.

Riley, McHenry county: mean temperature, 69°.5, is 1°.2 below the July average of the last twenty-two years.

Indiana.—Vevay, Switzerland county: mean temperature, 77°.3, is 1°.4 below the July mean of the last eight years.

Wabash, Wabash county: mean temperature, 72°.4, is 1°.9 below the July average of the last seven years.

Kansas.—Manhattan, Riley county: mean temperature, 73°.7, is 5°.4 below the July average of twenty-four years.

Lawrence, Douglass county: mean temperature, 76°.2, is 2°.2 below the July average of sixteen years.

Wellington, Sumner county: mean temperature, 74°.5, is 3°.4 below the July average of the four preceding years.

Maine.—Gardiner, Kennebec county: mean temperature, 66°.9, is 1°.9 below the July average of the last forty-seven years. The highest July mean of that period, 74°.2, occurred in 1854; the lowest, 65°.4, occurred in 1844.

New York.—Palermo, Oswego county: mean temperature, 64°.8, is 4°.8 below the July normal of the last thirty years. The highest July mean of that period, 79°.1, occurred in 1868; the lowest, 62°.0, occurred in 1860.

North Volney, Oswego county: mean temperature, 67°.2, is 2°.7 below the July normal of a period of sixteen years.

Ohio.—Wauseon, Fulton County: mean temperature, 70°.0, is 2.°8 below the July average of the last thirteen years. The highest July mean of that period, 75°.3, occurred in 1878; the lowest, 67°.7, occurred in 1882.

Pennsylvania.—Dyberry, Wayne county: mean temperature, 66°.9, is 1°.5 below the July mean of the last sixteen years. The highest July mean of that period, 71°.7, occurred in 1887; the lowest, 63°.9, occurred in 1865.

Table of Comparative Maximum Temperatures for the Month of July.

State or Territory.	Maximum for July, 1883, Signal Service.		Maximum since Signal-Service stations were opened—3 to 12 years.			Highest from any other source.			
	Station.	Temp.	Station.	Temp.	Year.	Place.	Temp.	Year.	Length of Record.
		°		°			°		
Alabama	Mobile	100	Montgomery	107	1881	Mount Vernon Arsenal	100		33 years.
Do	Montgomery	99	Mobile	101	1881	Opelika	102	1882	1 "
Arizona	Phœnix	112	Yuma	118	1878	Fort Mojave	118	'70,'73	22 "
Do	Yuma	111	Stanwix	116	1877	Texas Hill	118	1882	— "
Arkansas	Fort Smith	100	Little Rock	100	'79,'81	Washington, (near)	108	1860	28 "
California	Red Bluff	107	Red Bluff	110	1879	Fort Yuma	119	1877	32 "
Do	Sacramento	104	Visalia	107	1879	Fort Miller	118	1853?	13 "
Colorado	West Las Animas	100	Denver	102	1874	Fort Lyon	108	'68'69'78	23 "
Connecticut	New Haven	91	New Haven	95	1876	New Haven	101	1864?	88 "
Dakota	Yankton	103	Fort Sully	109	1877	Fort Sully	114	1871	17 "
Delaware	Delaware Breakwater	89	Delaware Breakwater	91	1880	Fort Delaware	101	1865	45 "
District of Columbia	Washington	97	Washington	102	1879	Washington	103	1838	49 "
Florida	Sanford	99	Jacksonville	104	1879	Fort King	103		10 "
Georgia	Augusta	100	Augusta	105	1878	Forsyth	106	1881	7 "
Do	Atlanta	95	Savannah	105	1879	McPherson Barracks	107	1878	7 "
Idaho	Lewiston	98	Fort Lapwai	104	1881	Fort Boisé	113		15 "
Do	Couer d'Alene	95	Boisé City	106	1877				
Illinois	Springfield	95	Springfield	102	1879	Chicago	106	1868	39 "
Do	Chicago	91	Cairo	99	'74,'81				
Indiana	Indianapolis	92	Indianapolis	101	1881	Wabash	104	1876	1 "
Do						Spiceland	100	'64,'81	15 "
Indian Territory	Fort Sill	102	Fort Gibson	109	1879	Fort Sill	109	1871	10 "
Do			Fort Sill	106	1881	Fort Arbuckle	109	1856	20 "
Iowa	Des Moines	97	Dubuque	101	1874	Fort Madison	105	1870	20 "
Do	Dubuque	96	Keokuk	100	1874	Brookstine	105	1868	5 "
Kansas	Leavenworth	96	Dodge City	108	1876	Fort Larned	115	1871	15 "
Kentucky	Louisville	95	Louisville	102	1874	Newport Barracks	98		29 "
Louisiana	Shreveport	102	Shreveport	107	1875	Baton Rouge	102	'77,'78	57 "
Maine	Portland	89	Portland	97	1870	Brunswick	102	1808	53 "
Do						Fort Preble	101	1881	60 "
Maryland	Baltimore	96	Baltimore	99	'76,'79,	Fort Washington	102		46 "
Do					'80	Fort McHenry	102	1879	51 "
Massachusetts	Boston	96	Boston	101	1880	Westborough	103	1870	7 "
Do						Fort Warren	100	1872	19 "
Michigan	Marquette	94	Detroit	100	1878	Marquette	103	1862	9 "
Do			Marquette	100	1878	Monroe	103	1866	11 "
Minnesota	Saint Paul	100	Saint Paul	99	1874	Fort Ripley	103	1871	16 "
Do	Saint Vincent	96	Breckenridge	97	1878	Fort Snelling	100	1838	62 "
Mississippi	Vicksburg	96	Vicksburg	100	'78,'81	Brookhaven	102	1880	7 "
Do						Meridian	104	1882	1 "
Missouri	Saint Louis	96	Saint Louis	104	1881	Allenton	109	1868	4 "
Do			Springfield	98	1882	Saint Louis	103		38 "
Montana	Fort Custer	97	Fort Keogh	109	1881	Fort Shaw	112	1872	13 "
Nebraska	Omaha	99	North Platte	107	1877	Fort McPherson	115	1870	15 "
Do	North Platte	95	Omaha	105	1874	Glendale	106	1808	2 "
Nevada			Winnemucca	104	1877	Camp Halleck	110	1876	11 "
New Hampshire	Mount Washington	60	Mount Washington	72	1881	Stratford	100	1808	11 "
New Jersey	Little Egg Harbor	98	Sandy Hook	100	1876	Haddonfield	102	1866	7 "
New Mexico	Fort Bayard	99	La Mesilla	107	'80,'82	Fort McRae	116	1873	10 "
Do			Fort Bayard	115	1882	Fort Craig	112	1857	29 "
New York	Albany	94	Oswego	100	1878	Newburg	105	1849	40 "
Do	Oswego	92	New York City	99	1876	Fort Columbus	104	1821	61 "
North Carolina	Kittyhawk	100	Wilmington	103	1879	Weldon	107	1879	9 "
Do	Sloop Point	100	Charlotte	101	1879	Fort Johnson	104	1831	57 "
Ohio	Columbus	94	Cincinnati	103	'74,'81	Jacksonburg	104	1881	8 "
Do	Toledo	93	Columbus	103	1881	Marietta	102	1859	54 "
Oregon	Portland	94	Umatilla	107	1880	Fort Dalles	105	1853	15 "
Pennsylvania	Philadelphia	96	Pittsburg	103	1881	Carlisle Barracks	105	1868	38 "
Rhode Island	Narragansett Pier	87	Newport	92	1878	Fort Adams	102	1869	41 "
South Carolina	Charleston	101	Charleston	104	1879	Charleston	101	1752	105 "
Do						Stateburg	103	1881	2 "
Tennessee	Chattanooga	97	Chattanooga	101	1879	Castalian Springs	103	1875	3 "
Do	Knoxville	56	Nashville	101	'74,'79	Glenwood Cottage	99	1860	11 "
Texas	El Paso	110	Eagle Pass	112	1881	Fort Mason	114	1860	9 "
Do	Rio Grande City	104	Laredo	110	1879	Camp Stockton	111		16 "
Utah	Salt Lake City	96	Salt Lake City	98	1877	Camp Douglass	103		20 "
Do						Mount Carmel	112	1877	3 "
Vermont			Burlington	96	1878	Randolph	102	1868	5 "
Virginia	Norfolk	98	Norfolk	102	'76,'79,	Dover Mines (near)	104	1879	3 "
Do					'80,'81	Fortress Monroe	101	1891	57 "
Washington	Spokane Falls	97	Almota	105	1882	Fort Walla Walla	107	'59,'60	13 "
Do	Dayton	98	Dayton	102	1880	Cape Disappointment	104	1865	9 "
West Virginia			Morgantown	97	1874	Flemington	98	1881	1 "
Wisconsin	La Crosse	95	La Crosse	101	1874	Embarrass	104	1866	14 "
Wyoming	Cheyenne	94	Cheyenne	100	1881	Fort Laramie	107	1876	27 "

Texas.—New Ulm, Austin county: mean temperature, 82°.0, is 0°.5 below the July normal of the last twelve years. The highest July mean of that period, 84°.4, occurred in 1879; the lowest, 80°.6, occurred in 1880.

Vermont.—Woodstock, Windsor county: mean temperature, 67°.8, is 0°.3 below the July normal of the last sixteen years. The highest July mean of that period, 71°.3, occurred in 1878; the lowest, 64°.3, occurred in 1869.

Virginia.—Variety Mills, Nelson county: mean temperature, 74°.6, is 1°.9 below the normal of the past six years. The highest July mean of that period, 79°.5, occurred in 1878: the lowest, 72°.5, occurred in 1882.

West Virginia.—Helvetia, Randolph county: mean temperature, 70°.0, is 0°.2 below the July average of seven years.

MONTHLY RANGES OF TEMPERATURE.

The following stations report the largest monthly ranges of temperature for July:

Dayton, Washington Territory, 56°; Fort Shaw, Montana, 56°; Fort Meade, Dakota, 56°; Fort Buford, Dakota, 56°; Coeur d'Alene, Idaho, 55°; San Carlos, Arizona, 54°; Fort Custer, Montana, 54°; Marquette, Michigan, 54°; Saint Vincent, Minnesota, 53°; Huron, Dakota, 53°; Cheyenne, Wyoming, 53°; Wickenburg, Arizona, 52°; Fort Bennett, Dakota, 52°; Duluth, Minnesota, 52°; Fort Assinniboine, Montanna, 51°; Yankton, Dakota, 51°.

The stations reporting the smallest monthly ranges are as follows:

Fort Macon, North Carolina, 19°; Galveston, Texas, 20°; New Orleans, Louisiana, 20°; Indianola, Texas, 21°; Key West and Pensacola, Florida, 21°; Hatteras and Smithville, North Carolina, 22°; Cedar Keys, Florida, 23°; Portsmouth, North Carolina, 23°; Cape Mendocino, California, 24°; Palestine, Texas, 26°; Delaware Breakwater, Delaware, 27°, and 28° at the following stations: Grand Haven, Michigan; Buffalo, New York; Eastport, Maine; New River and Wilmington, North Carolina; Augusta and Savannah, Georgia; Jacksonville, Florida.

The greatest daily ranges have varied in the different districts as follows:

New England.—From 19° at Block Island, Rhode Island, on the 8th, and on the summit of Mount Washington, New Hampshire, on the 8th and 10th, to 33° at Boston, Massachusetts, on the 2d.

Middle Atlantic states.—From 17° at Cape May, New Jersey, on the 22d, to 29° at Washington, District of Columbia, on the 2d, and at Norfolk, Virginia, on same day.

South Atlantic states.—From 14° at Fort Macon, North Carolina, on the 27th, to 27° at Kittyhawk, North Carolina, on the 24th.

Florida peninsula.—From 16° at Key West, on the 7th, to 25° at Sanford, on the 9th.

Eastern Gulf.—From 16° at New Orleans, Louisiana, on the 18th, to 27° at Mobile, Alabama, on the 1st.

Western Gulf.—From 16° at Galveston, Texas, on the 19th and 29th, to 32° at Fort Smith, Arkansas, on the 10th.

Tennessee.—From 26° at Nashville, on the 20th, to 29° at Knoxville, on the 21st, and at Chattanooga, on the 20th and 21st.

Ohio valley.—From 22° at Cincinnati, Ohio, on the 3d, to 32° at Pittsburg, Pennsylvania, on the 5th.

Lower lakes.—From 21° at Buffalo, New York, on the 26th, to 31° at Oswego, New York, on the 27th.

Upper lakes.—From 21° at Grand Haven, Michigan, on the 1st, to 42° at Duluth, Minnesota, on same date.

Extreme northwest.—From 36° at Bismarck, Dakota, on the 22d, to 42° at Moorhead, Minnesota, on the 9th.

Upper Mississippi valley.—From 22° at Cairo, Illinois, on the 16th, to 32° at Des Moines and Dubuque, Iowa, on the 1st.

Missouri valley.—From 26° at Omaha, Nebraska, on the 15th, to 40° at Fort Bennett, Dakota, on the 25th.

Northern slope.—From 31° at North Platte, Nebraska, on the 15th, to 49° at Fort Shaw, Montana, on the 18th.

Middle slope.—From 34° at Denver, Colorado, on the 2d, to 47° at West Las Animas, Colorado, on the 18th.

Southern slope.—From 31° at Fort Concho, Texas, on the 22d, to 33° at Fort Stockton, Texas, on the 19th, 29th, and 30th.

Southern plateau.—From 29° at Fort Grant, Arizona, on the 17th, to 45° at Fort Apache, on the 17th.

Northern plateau.—From 41° at Spokane Falls, Washington territory, on the 17th, to 45° at Dayton, Washington territory, on same date.

North Pacific coast.—From 33° at Portland, Oregon, on the 5th, to 42° at Roseburg, Oregon, on same date.

Middle Pacific coast.—From 21° at San Francisco, California, on the 1st, to 37° at Sacramento, California, on the 11th and 25th.

Table of Maximum and Minimum Temperatures for July, 1883.

State or Territory.	Signal Service.			U. S. Army Post Surgeons, or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
		°	°		°	°
Alabama	Mobile	100	71	State Line	107	66
Do	Montgomery	99	69	Tuscaloosa	101	53
Arizona	Phœnix	112	65	Texas Hill	115	80
Do	Fort Apache	97	51	San Simon	108	65
Arkansas	Fort Smith	100	64	Brinkley	101	49
Do	Little Rock	94	64	Lead Hill	100	61
California	Red Bluff	107	58	Borden	114	60
Do	Cape Mendocino	69	45	Chualar	80	40
Colorado	West Las Animas	100	56	Fort Lewis	87	45
Connecticut	New Haven	91	52	Southington	96	56
Dakota	Yankton	103	52	Webster	108	49
Do	Fort Buford	96	40	Fort Meade	98	35
Delaware	Del. Breakwater	89	62			
District of Columbia	Washington	97	62	Rock Creek Bridge	98	66
Florida	Sanford	99	70	Live Oak	104	65
Do	Cedar Keys	92	69	Limona	100	70
Georgia	Augusta	100	72	Way Cross	107	66
Do	Atlanta	95	64	Gainesville	98	47
Idaho	Lewiston	98	50			
Do	Cœur d'Alene	95	40			
Illinois	Springfield	95	54	Peoria	93	52
Do	Chicago	91	51	Riley	93	46
Indiana	Indianapolis	92	57	Laconia	97	56
Do				Glenwood	89	46
Indian Territory	Fort Sill	102	62			
Iowa	Dubuque	96	51	Guttenburg	100	54
Do	Des Moines	97	54	Cedar Rapids	93	46
Kansas	Leavenworth	96	59	Clay Centre	103	62
Do				Holton	96	53
Kentucky	Louisville	95	61	Bowling Green	94	62
Louisiana	Shreveport	102	71	Coushatta	104	68
Do	New Orleans	94	74	Amite City	102	62
Maine	Portland	89	53	Cornish	95	52
Do	Eastport	76	48	Gardiner	85	44
Maryland	Baltimore	96	62	Cumberland	90	56
Massachusetts	Boston	96	51	Westborough	98	44
Do	Thatcher's Island	84	52	Somerset	97	50
Michigan	Marquette	94	40	Thornville	91	47
Do	Detroit	91	50	Hillsdale	89	43
Minnesota	Saint Paul	100	52	Northfield	94	44
Do	Saint Vincent	93	40	Minneapolis	94	57
Mississippi	Vicksburg	96	68	Columbus	107	63
Do				Aberdeen	97	59
Missouri	Saint Louis	96	59	Big Creek	100	56
Do				Greenfield	97	52
Montana	Fort Custer	97	43	Fort Assinniboine	97	40
Do	Fort Shaw	94	38	Fort Shaw	94	30
Nebraska	Omaha	99	55	Lincoln	106	61
Do	North Platte	95	54	Fort Niobrara	109	45
Nevada				Hot Springs	104	50
New Hampshire	Mount Washington	60	27	New Market	94	48
Do				Grafton	90	42
New Jersey	Little Egg Harbor	98	58	Freehold	98	51
Do	Atlantic City	94	57	Vineland	98	56
New Mexico	Fort Bayard	99	58	Fort Union	90	44
New York	Albany	94	54	West Point	95	50
Do	Oswego	92	52	Madison Barracks	83	44
North Carolina	Kittyhawk	100	64	Wadesboro'	104	63
Do	Sloop Point	100	63	Salisbury	104	60
Ohio	Columbus	94	54	Canal Dover	100	50
Do	Toledo	93	50	Westerville	91	47
Oregon	Portland	94	48	Eola	91	52
Do	Roseburg	93	46	Albany	89	54
Pennsylvania	Erie	88	52	Fallsington	93	57
Do	Philadelphia	96	54	Wilkesbarre	92	43
Rhode Island	Narragansett Pier	87	56			
Do	Point Judith	84	52			
South Carolina	Charleston	101	71	Cheraw	105	63
Do				Hardeeville	103	53
Tennessee	Chattanooga	97	62	Milan	99	58
Do	Knoxville	96	58	Paris	98	57
Texas	El Paso	110	62	Hempstead	102	50
Do	Fort Elliott	96	54			
Utah	Salt Lake City	96	55	Nephi	93	62
Vermont				Woodstock	90	39
Virginia	Norfolk	98	65	Accotink	98	60
Do	Lynchburg	97	58	Snowville	92	50
Washington	Spokane Falls	97	46	Fort Spokane	102	42
Do	Dayton	98	42			
West Virginia				Helvetia	92	48
Wisconsin	La Crosse	95	52	Neillsville	97	42
Do	Milwaukee	90	50			
Wyoming	Cheyenne	94	44	Fort Bridger	89	32

South Pacific coast.—From 34° at Los Angeles, California, on the 24th and 30th, to 36° at Yuma, Arizona, on the 16th.

HIGH TEMPERATURES.

Philadelphia, Pennsylvania.—The maximum temperature on the 6th was 95°. Thirteen cases of sunstroke occurred in this city, seven of which number resulted fatally.

Decatur, Illinois.—The temperature rose to 96° in the shade at this place on the 3d. Two cases of sunstroke occurred, neither of which proved fatal.

Cleveland, Ohio.—July 3d was the hottest day of this season; the thermometer rose to 96° in the shade and to 128° in the sun. Several cases of sunstroke occurred.

Vandalia, Illinois.—The thermometer indicated a temperature of 102° in the shade at this place on the 2d. The heat was so oppressive that all out-door work was generally abandoned during a greater part of the day.

Hillsboro', Illinois.—The 2d and 3d were the hottest days of the year at this place. The thermometer registered over 95° in the shade.

FROSTS.

Factoryville, New York.—A light frost occurred at places in the valley on the morning of July 1st, but caused no damage.

Friendship, New York.—A light frost occurred in this locality on the morning of the 1st.

Light frosts occurred on the morning of the 8th at Lansing, Michigan, and at Embarrass, Wisconsin.

Davenport, Iowa.—A light frost occurred here on the morning of the 18th, causing no damage.

Boston, Massachusetts. — A telegram from the Crawford House, White Mountains, New Hampshire, states that a heavy frost occurred there during the night of the 25–26th.

At Wellsborough, Pennsylvania, a light frost occurred on the morning of the 30th; minimum temperature, 45°

On the summit of Mount Washington, New Hampshire, frost occurred on the following dates: 1st, 9th, 10th, 19th, 20th, 21st, 24th, 25th, 26th.

ICE.

The only instance of the formation of ice during July is reported from the Signal-Service station on the summit of Mount Washington, New Hampshire. On the morning of the 1st the thermometer recorded a minimum temperature of 27°, and ice formed to a thickness of nearly one inch.

PRECIPITATION.

[*Expressed in inches and hundredths.*]

The distribution of rainfall for July, as determined from the reports from more than six hundred stations, is exhibited on chart iv.

In the lake region, New England, the Ohio and upper Mississippi valleys, and over the southern part of the United States from western Texas to Arizona, the monthly rainfall has exceeded the average for July. The excesses are largest in the upper lake region, Mew England, and in the upper Mississippi valley, where they are 2.06, 1.84, and 1.56, respectively. Deficiencies in the monthly rainfall have occurred in all parts of the country, with the exception of the above-named districts. Marked deficiencies occurred in the Gulf states, and in consequence severe droughts prevailed in some localities. The greatest departures below the average rainfall are, 2.54 in the eastern Gulf states; 1.72 in the western Gulf states; 1.28 in Florida; 1.12 in the northern slope; and 1.07 in the Missouri valley. No rain fell at any of the stations in the Pacific states, except .01 at Roseburg, Oregon, and an inappreciable amount at Los Angeles, California. In the middle and south Atlantic states the rainfall for the month is about three-fourths of an inch below the average for July.

In the first column of the following table is given the average rainfall for July in the various districts for several years; in the second column is given the average of July, 1883; and the third column shows the excess or deficiency of July, 1883, as compared with the average of that month in previous years:

Average precipitation for July, 1883.

Districts.	Average for July. Signal-Service observations.		Comparison of July, 1883, with the average for several years.
	For several years.	For 1883.	
	Inches.	*Inches.*	*Inches.*
New England	3.92	5.76	1.84 excess.
Middle Atlantic states	4.04	3.28	0.76 deficiency.
South Atlantic states	5.65	4.92	0.73 deficiency.
Florida peninsula	5.77	4.49	1.28 deficiency.
East Gulf	5.04	2.50	2.54 deficiency.
West Gulf	4.16	2.44	1.72 deficiency.
Tennessee	4.06	3.07	0.99 deficiency.
Ohio valley	4.55	5.35	0.80 excess.
Lower lakes	3.84	4.51	0.67 excess.
Upper lakes	3.36	5.42	2.06 excess.
Extreme northwest	2.83	2.44	0.39 deficiency.
Upper Mississippi valley	4.02	5.58	1.56 excess.
Missouri valley	4.44	3.37	1.07 deficiency.
Northern slope	1.94	0.82	1.12 deficiency.
Middle slope	2.77	2.57	0.20 deficiency.
Southern slope	2.50	3.19	0.69 excess.
Northern plateau	1.01	0.00	1.01 deficiency.
Southern plateau	2.35	2.50	0.15 excess.
North Pacific coast	0.58	0.00	0.58 deficiency.
Middle Pacific coast	0.01	0.00	0.01 deficiency.
South Pacific coast	0.08	0.15	0.07 excess.
Mount Washington, N. H.	7.43	11.14	3.71 excess.
Pike's Peak, Col.	4.89	5.37	0.48 excess.
Salt Lake City, Utah	0.68	0.10	0.58 deficiency.

The general distribution of rainfall for the month of July, with the districts of maximum departures from the normal, in each year since 1873, are as follows:

Districts.	Maximum departures.	Year.	Remarks.
		1873	Excessive over the northern districts from the upper lakes to the New England coast; normal in the south Atlantic and Gulf states; deficient in the Ohio, Mississippi, and Missouri valleys.
Western Gulf	+ 4.20	1874	Excessive in the Saint Lawrence valley, lower lake region, New England, and in the south Atlantic and Gulf states; deficient in other districts, except normal in the middle Atlantic states.
Eastern Gulf	+ 1.85		
Saint Lawrence valley	+ 1.40		
Minnesota	— 3.10		
Upper Mississippi valley	— 0.85		
Ohio valley	+ 5.60	1875	Large excesses in the upper Mississippi, lower Missouri, and Ohio valleys, and a slight excess in New England; large deficiencies on the Pacific coast, in Minnesota, and in the south Atlantic and Gulf states, slight deficiencies in the lake region and Saint Lawrence valley; normal in the middle Atlantic states In the Ohio valley the rainfall was nearly three times as great as the normal.
Missouri valley	+ 4.80		
Upper Mississippi valley	+ 2.75		
South Atlantic states	— 4.85		
Minnesota	— 4.11		
Eastern Gulf	— 3.55		
Lower Missouri valley	+ 3.35	1876	Deficient in the upper Missouri and Ohio valleys, Tennessee, west Gulf states, and on the Pacific coast; excessive in all other districts.
Eastern Gulf	+ 2.10		
Upper Mississippi valley	+ 1.25		
Western Gulf	— 0.90		
Ohio valley and Tennessee	— 0.25		
South Atlantic states	+ 1.38	1877	Excessive in the middle and south Atlantic states; normal in Minnesota, New England, and on the Pacific coast; deficient in the lake region, and in the Ohio, Saint Lawrence, upper Mississippi, and Missouri valleys.
Middle Atlantic states	+ 1.28		
Ohio valley	— 3.74		
Saint Lawrence valley	— 0.83		
Lower lakes	+ 1.98	1878	Deficient in the east Gulf states, Ohio valley, New England, and in California; excessive in all other districts.
Tennessee	+ 1.83		
Upper Missouri valley	+ 1.40		
Eastern Gulf	— 1.36		
Ohio valley	— 0.09		
Minnesota	+ 3.63	1879	Deficient in the middle Atlantic and west Gulf states, in the Ohio and lower Missouri valleys, and in California; excessive in all other districts, the departures being very slight in the lower lakes and south Atlantic states.
Upper Missouri valley	+ 3.40		
Eastern Gulf	+ 2.46		
Western Gulf	— 1.15		
Ohio valley	— 1.09		
Western Gulf	+ 2.84	1880	Deficient on the Pacific coast, in Florida, Tennessee, Minnesota, and in the upper Missouri and upper Mississippi valleys; normal in the lower lakes and lower Missouri valley; excessive in the upper lakes, Saint Lawrence valley, and in the states bordering on the Atlantic ocean and Gulf of Mexico, except in Florida.
South Atlantic states	+ 1.73		
Middle Atlantic states	+ 1.08		
Ohio valley	— 2.71		
Upper Missouri valley	— 1.59		
Upper Mississippi valley	— 1.58		
Florida	+ 1.82	1881	Excessive in the north Pacific coast region, Florida, the south Atlantic states, upper lake region, and upper Mississippi valley, the departures in the two latter districts being very slight; deficient in all other parts of the country, except normal in California.
South Atlantic states	+ 0.77		
Ohio valley	— 2.58		
Tennessee	— 2.40		
Eastern Gulf	— 2.16		
Middle Atlantic states	— 2.05		
Southern slope	+ 3.04	1882	Excessive in the south Atlantic and Gulf states, southern slope, extreme northwest, and north Pacific coast region, the departures being very small in the last-named district; deficient in all other districts, except normal in California.
Western Gulf	+ 1.95		
South Atlantic states	+ 1.73		
Ohio valley	— 1.74		
Missouri valley	— 1.42		
Lower lakes	— 1.34		